Space Weather Forecast

Issued on Sunday, 30 January 2022 at 12:46 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance G1/Minor Geomagnetic Storm day 1 (30th). Chance of further Moderate flares/R1-R2 Radio Blackouts. Potential for an Earth-directed CME after recent Moderate flare - analysis ongoing.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate through the last 24 hours, also with frequent Common-class flare activity. Most of the flares originated from the large sunspot group in the northeast quadrant, approaching centre disc, and also an active region just rotating onto the southeast limb. The largest flare observed was a low level Moderate-class flare, from the large sunspot group, which subsequently produced a coronal mass ejection (CME), which could be Earth-directed, although currently awaiting the analysis result.

There are currently three other numbered sunspot regions on the visible disc, these much smaller, simpler, and less active. These are located in the southwest, northwest and northeast quadrants. No other Earth-directed CMEs have been observed.

Solar Wind / Geomagnetic Activity: The solar wind has slowly declined from elevated to slightly elevated levels, near 450km/s during the period. The magnetic field has been relatively weak, with a slow overall downward trend. The important north-south direction variable and also weak. Geomagnetic Activity was mostly Quiet to Unsettled (Kp 1-3), with an Active interval 29/1200-1500UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate solar activity is expected through the period, with a chance of further isolated Moderate-class flares, and a slight chance of Large flares. These again most likely from AR2936, and an active region beginning to rotate onto the southeast limb and another emerging onto the northeast horizon.

Solar Wind / Geomagnetic Activity: A CME from 26 Jan could pass close to Earth on day 1 (30 Jan), although confidence is low. Otherwise, slightly elevated solar winds at first on day 1 (30th) are likely to gradually trend downwards towards background through the rest of the period, as the current fast wind wanes. A further slight enhancement is possible from later on day 3 (01 Feb) from coronal hole 48.

Geomagnetic activity is expected to be Quiet to Unsettled (Kp 1-3) with a chance of isolated Active intervals (Kp 4) and a slight chance of G1/Minor Storm (Kp 5) interval on day 1 (30th Jan). Thereafter, becoming generally Quiet to Unsettled, perhaps with a chance of isolated Active intervals from later day 3 (01 Feb). However, pending analysis of the CME from the M1 flare,

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which could be Earth-directed, may result in an enhancement of geomagnetic activity, probably later in the period.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to most likely remain at background levels, however probabilities increase slightly through the period as the large sunspot group transits west.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	5	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	40	40	40	40
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	2	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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